

NASA TECH BRIEF

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Gas Chromatography of Volatile Organic Compounds

A new gas chromatographic sampling system has been applied successfully to a wide range of volatile organic compounds. Trace quantities of substances with carbon numbers up to C_{18} can be concentrated easily on a new commercially available porous polymer, 2,6-diphenyl-p-phenylene oxide. The main characteristics of this adsorbent are excellent temperature stability (up to 370°C), inertness, and ease of handling.

Besides gases and air, samples also can be obtained from aqueous media by headspace techniques, using a simple water-cooled condenser (Figure 1) to prevent

water from entering the packing. This arrangement allows the sample to be heated to increase the concentration of volatiles, without any loss of sample constituents. Once trapped on the adsorbent, the sample can be stored at room temperature over a period of weeks, if necessary, without apparent changes.

The adsorbent is contained in a standardized glass tube, which can be inserted in a specially-designed heated injector block. The volatiles are desorbed at 300°C and carried onto a short precoated capillary column (Figure 2), which is kept at the temperature

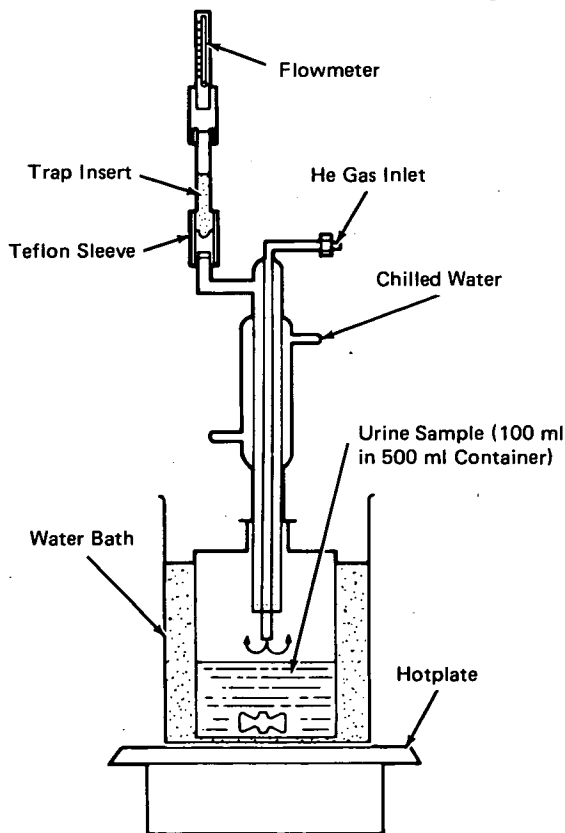


Figure 1. Aqueous Sampler

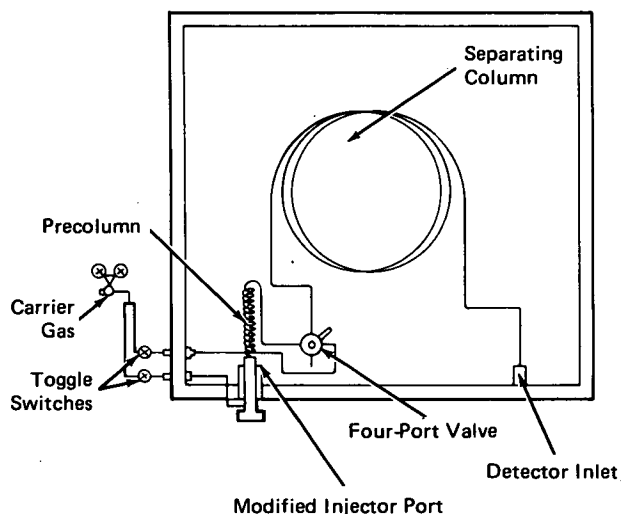


Figure 2. Sample Transfer and Analysis

of dry ice (-80°C). After completion of sample transfer (approximately 10 min), the coolant is removed, the main trap is connected to the analytical capillary column, and the separation is started.

The system has been used for problems such as the analysis of volatile metabolites in human blood and urine,

(continued overleaf)

the analysis of air pollutants, and in tobacco smoke chemistry. Since the adsorbent is reusable after proper reconditioning (350° C), the method is both convenient and economical. Furthermore, because the sample can be stored for several weeks, this system could be used for large scale on-site sampling programs in which the sample is shipped to a central location for analysis.

Note:

Requests for further information may be directed to:
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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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